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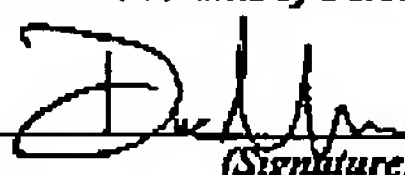
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PRE-APPEAL BRIEF REQUEST FOR REVIEW		Docket Number (Optional)	
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		10/708,748	03/23/04
		First Named Inventor	
		Wei Lu	
		Art Unit	Examiner
		2881	P. Johnston
<p>Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.</p> <p>This request is being filed with a notice of appeal.</p> <p>The review is requested for the reason(s) stated on the attached sheet(s). Note: No more than five (5) pages may be provided.</p> <p>I am the</p> <p><input type="checkbox"/> applicant/inventor.</p> <p><input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)</p> <p><input checked="" type="checkbox"/> attorney or agent of record. Registration number <u>53,352</u></p> <p><input type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____</p> <p>NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.</p> <p><input type="checkbox"/> *Total of _____ forms are submitted.</p>			

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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CERTIFICATE OF TRANSMISSION BY FACSIMILE (37 CFR 1.8)			Docket No. FIS920030308US1
Applicant(s): Wei Lu			
Application No. 10/708,748	Filing Date 03/23/04	Examiner P. Johnston	Group Art Unit 2881
Invention: PT COATING INITIATED BY INDIRECT ELECTRON BEAM FOR RESIST CONTACT HOLE			
<p>I hereby certify that this _____ <i>(Identify type of correspondence)</i> is being facsimile transmitted to the United States Patent and Trademark Office (Fax. No. 571-273-8300) on 05/10/06 <i>(Date)</i></p> <p style="text-align: right;">Duane N. Moore <i>(Typed or Printed Name of Person Signing Certificate)</i>  <i>(Signature)</i></p> <p>Note: Each paper must have its own certificate of mailing.</p>			

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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE MAY 10 2006

In re patent application of:

Lu, et al.

Serial No.: 10/708,748

Group Art Unit: 2881

Filed: March 23, 2004

Examiner: Johnston, Phillip A.

For: PT COATING INITIATED BY INDIRECT ELECTRON BEAM FOR RESIST  
CONTACT HOLECommissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

## ATTACHMENT TO PRE-APPEAL BRIEF REQUEST FOR REVIEW

Sir:

This pre-appeal brief request is being submitted together with a notice of appeal and is in response to the Office Action mailed February 10, 2006, setting a three-month statutory period for response. Therefore, this request is timely filed. Claims 1-5, 8-12, and 15-18 stand rejected under 35 U.S.C. §102(b) as being anticipated by Fujii (U.S. Patent No. 5,574,280), hereinafter referred to as Fujii. Claims 7, 14, and 20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Fujii, in view of Berger, et al. (U.S. Publication No. 2004/0065826), hereinafter referred to as Berger. Claims 6, 13, and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Fujii, in view of Christy (U.S. Patent No. 3,119,707), hereinafter referred to as Christy. In addition, the Office Action relies on Matsui (U.S. Patent No. 6,758,900), hereinafter referred to as Matsui, and Collins (U.S. Patent No. 4,509,451), hereinafter referred to as Collins, as secondary references. Applicants respectfully traverse these rejections based on the following discussion.

Applicants respectfully traverse these rejections because the rejections contain two clear errors. First, the references miss the claim element of directing an electron beam at a structure to create secondary electron beams as the electron beam strikes

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sidewalls, wherein the secondary electron beams break down precursor gas to form a metal coating. Secondly, the rejections do not provide evidentiary support the motivational statement as to why one ordinarily skilled in the art would have combined/modified the references as suggested in the Office Action.

#### A. Missing Claim Element

Applicants respectfully submit that none of the applied references teach or suggest the claimed feature of "directing an angled electron beam at said structure to create secondary electron beams as said angled electron beam strikes sidewalls of said topographical features, wherein said secondary electron beams break down said precursor metal gas to form a metal coating on said structure" as defined by independent claim 1. Further, none of the applied references teach or suggest the foregoing claimed feature wherein the "structure" is a "partially completed integrated circuit structure", as defined by independent claims 8 and 15, or wherein the "topographical features" are "vias", as defined by independent claim 15.

In the rejection, the Office Action argues that Fujii discloses a method of observing a sample surface using an electron beam and an inorganic metal gas to deposit a metal film on the sample surface. In addition, the Office Action argues that Berger discloses an imaging system comprising an electron beam oriented at angle between thirty and sixty degrees; and, that Christy discloses an electron beam accelerated at 225 volts for forming a metal film. However, neither Fujii, Berger, nor Christy, individually or in combination, teach or suggest the use of secondary electron beams, which are created when angled electron beams strike topographical features, wherein the secondary electron beams break down precursor metal gas to form a metal coating. Rather, unlike the claimed invention, the cited references disclose secondary *particles* formed by an *ion* beam, wherein the secondary particles are used to detect and image a sample.

More specifically, Fujii discloses "secondary *particles*" that are not created by an *electron* beam; rather, the particles in Fujii are created by an *ion* beam (col. 1, lines 7-12, and 28-32 of Fujii). Further unlike the claimed invention, the secondary particles in Fujii are not used to form a metal coating; rather, they are utilized to form an image of the sample, i.e., they are detected by a detector to form an image of a section of the sample

(col. 1, lines 28-32, and col. 4, lines 4-8 of Fujii). Instead, the metal coating in Fujii is formed with the electron beam (which does not create secondary electron beams) and the inorganic metal gas (col. 2, lines 40-49 of Fujii), wherein the method of Fujii is not concerned about damaging delicate components underlying the sample surface.

In addition, the Office Action argues that Matsui and Collins disclose the use of electron beams in assisted CVD deposition. However, neither Matsui nor Collins teach or suggest directing an electron beam at a structure to create secondary electron beams as the electron beam strikes topographical features of the structure.

More specifically, Matsui discloses CVD deposition using a focused *ion beam 4*, which as the Office Action acknowledges, is different from an *electron beam* (Feb. 10, 2006 Office Action, p. 8, para. 2), wherein the ion beam 4 and a material gas 3 form a first-layer deposit 5 (col. 3, lines 33-36; FIG. 1(a) of Matsui). Furthermore, the first-layer deposit 5 is formed *before* the secondary electrons 6 of Matsui. More specifically, it is only after the first-layer deposit 5 is formed that ions can impinge on the first-layer deposit 5 to release secondary electrons 6 (col. 3, lines 37-39; FIG. 1(b) of Matsui). Therefore, because the first-layer deposit 5 is formed prior to the creation of the secondary electrons 6, the secondary electrons 6 cannot be used to form the first-layer deposit 5.

In fact, the secondary electrons 6 are used to form a terrace 7, not a metal coating (col. 3, lines 37-39; FIG. 1(b) of Matsui). Moreover, the terrace is formed over the first-layer deposit 5 (FIG. 1(b) of Matsui), which, as described above, is formed by the ion beam 4 and the material gas 3, not by the secondary electrons 6. After the secondary electrons 6 form the terrace 7 over the first-layer deposit 5, the ion beam 4 is once more used to form a second layer deposit 8 over the terrace 7. Again, the secondary electrons 6 are not used to form the second layer deposit 8.

Furthermore, the electrons in Collins collide with the reactant gas molecules directly; they do not come into direct contact with the substrate, i.e., the structure having the film formed thereon. As noted in Collins, col. 2, lines 60-68 – col. 3, line 1, “[h]igh energy electrons emitted from the glow discharge electron gun collide *directly with the reactant gas molecules* thereby dissociating these reactant species and creating free radicals including excited atoms and positive and negative ions. Alternatively the vacuum



ultraviolet rare gas photons and rare gas sensitized reactions can cause reactant dissociation via photo-absorption and sensitized gas collisions respectively. Secondary electrons are emitted in the ionizing collisions of beam electrons *with atoms and molecules.*" (Emphasis added). Moreover, as provided in the abstract of Collins, "[t]he electron beams are spatially confined and excite only a localized region above the substrate so that direct plasma bombardment of the substrate is avoided."

The Office Action also argues that Christy discloses that all metals and some insulators will emit secondary electrons when bombarded by electrons. However, the secondary electrons of Christy are not used to break down metal gas to form a coating; rather, the secondary electrons are removed from the target substrate for the purpose of attracting other electrons to the target surface to produce a thin film. Furthermore, the electrons disclosed in Christy are not used to form a metal coating – the electrons are used to form an insulative film.

More specifically, the secondary electrons of Christy are not used to break down metal gas to form a coating; rather, the secondary electrons are removed from the target substrate for the purpose of attracting other electrons to the target surface to produce a thin film. The arrival of an impinging electron will cause more than one electron (i.e., the secondary electrons) to be removed from the target substrate thereby leaving the substrate with an effective positive charge with respect to its original condition (col. 5, lines 33-39 of Christy). The effect is therefore to attract electrons to the target substrate surface thereby properly producing a thin film by the polymerizing process.

In addition, the electrons disclosed in Christy are not used to form a *metal* coating – the electrons are used to form an *insulative* film. As discussed in col. 3, lines 31-33 of Christy, an electron gun 16 is directed at a metal film 15 that is to be covered with the insulative film. Further, as noted in col. 4, lines 3-6 of Christy, the electron beam has the effect of cross-linking the vapor molecules of the polymerizable material used and thereby produces a thin insulative film. As such, the creation of an insulative film teaches away from the metal coating formed in the claimed invention. Accordingly, Christy does not teach the use of secondary electrons to break down metal gas to form a metal coating.


**B. No Evidence to Support the Motivation for a  
Proposed Combination of References**

The Office Action dated February 10, 2006, argues that one ordinarily skilled in the art would have combined Fujii and Berger and/or Christy to arrive at the claimed invention. The Office Action further argues that that one ordinarily skilled in the art would have further combined Matsui and/or Collins to arrive at the claimed invention. However, the Office Action does not provide any evidence or make reference to any teaching in support of such a proposition. Therefore, it is Applicants' position that the rejection contains clear error by not providing evidence to support the motivation for a proposed combination of references.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit  
Account Number 09-0458.

Respectfully submitted,

Dated: 5/10/06

  
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